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***J.B. Collip and the Development of Medical Research in Canada: Extracts and Enterprise.* By Alison Li. (Montréal: McGill-Queen's University Press, 2003. xiv + 244 p., ill., notes, bibl., index. ISBN 0-7735-2609-9 \$39.95)**

Most people are probably unfamiliar with the name James Bertram Collip (1892-1965), often dubbed "the forgotten member of the insulin team." The discovery of insulin in 1921-1922 put the University of Toronto on the medical research map and immortalized the names Frederick Banting and Charles Best, and to a much lesser degree John James Rickard Macleod and J.B. Collip. (Cf. Michael Bliss, *The*

Discovery of Insulin, Toronto: McClelland and Stewart, 1988; "J.B.Collip: A Forgotten Member of the Insulin Team," in *Essays in the History of Canadian Medicine*, edited by Wendy Mitchinson and Janice Dicken McGinnis, Toronto: McClelland and Stewart, 1988.) It was a turning point in the lives of the four insulin team members, including Collip, whose scientific career developed in extraordinary ways thereafter. In this biography of Collip's life and career, Alison Li demonstrates how Collip as a "scientist" and an "entrepreneur of science" contributed to the evolving structure, conduct and funding of medical research in Canada beyond the insulin discovery (p. xii).

Like all good biographies, this study presents a narrative of a life as well as the context within which it was lived. Li describes Collip's talents, drive, setbacks and achievements while also providing insight into medical research structures, the nature of scientific collaborations, the rise of endocrinology as a profession, the role of the pharmaceutical industry and the commercialization of medical products, among other themes. The first chapter outlines Collip's formative beginnings against the background of provincial education and scientific research of the times: his birth and early childhood in Belleville, Ontario; his entry at the age of 15 into the science program at Trinity College; his graduate training in biochemistry under mentor Archibald Byron Macallum at the University of Toronto; and his first academic job at the newly established University of Alberta. The second chapter describes Collip's sabbatical leave at the University of Toronto and his role in the discovery of insulin, specifically his contribution of purifying insulin and identifying its physiological effects. As the impact of the discovery became evident, Li recounts the internal frictions among the members of the insulin team as well as Collip's shrewd long-distance negotiations with University of Alberta administrators to improve the terms of his position.

After insulin, Collip's next scientific accomplishment was the preparation of an active extract of the parathyroid hormone. Chapter three describes this achievement and, most welcome, is Li's analysis of the priority dispute, patent claims and industrial competition that fueled controversy over this work. Between 1924 and 1927, Collip conducted experiments on the parathyroid hormone and established his authority on the subject, apparently unaware of similar results completed earlier by medical practitioner Adolph Hanson. The controversy took on the dimensions of the "career scientist" (Collip) versus the "lone physician-scientist" (Hanson) (p. 45). Eli Lilly & Company developed Collip's parathyroid extract while Parke-Davis & Company marketed Hanson's parathyroid extract, with each firm offering competing unit sizes for the hormone—"Collip Units" and "Hanson Units" respectively (p. 51). In

1932, Hanson won his patent claim for his clinical results; however the scientific community credited the discovery to Collip for his experimental science results relating to the extract preparation and its physiological actions. The case demonstrated that, while collaborative ventures between academic and commercial laboratories translated into quicker practical application and generated new funds for research in the form of royalties, it did not come without a price. Li argues that “the technicalities of patent law and the demands of commerce reshaped the manner in which scientific findings were transmitted and the priority for discoveries was established” (p. 58).

In 1928, Collip left the University of Alberta to become Chair of the Department of Biochemistry at McGill University, where he remained until 1947. For these two decades, Collip was on top of his game. Chapters four, five and six focus on “the great years” of Collip’s research career, predominantly his scientific work on the isolation and study of specific sex hormones, his management of a large, productive laboratory, and his skill at sustaining his broad research program financially. Working with the hormones of the placenta, Collip isolated Emmenin, the first orally active estrogen in the early 1930s. Once again, Collip turned to Eli Lilly & Company to manufacture and distribute the hormone in the United States. For Canadian production, Collip worked with Ayerst, McKenna & Harrison, a small Montreal-based pharmaceutical company. Ayerst researchers later developed a more potent estrogen hormone, Premarin, which furthered their success in the field of estrogen replacement therapy. This in turn resulted in royalties paid to Collip, financially stabilizing his research program. Li points out that Collip successfully transitioned “from working with one or two associates to heading up a large laboratory group, a configuration that was to become characteristic of modern medical research” (p. 89). Not all clinician-researchers or scientists of this period were able to do so. Collip fostered a cooperative and team environment in which researchers were awarded significant autonomy to pursue related endocrine research. A “hub of activity” during the 1930s, Collip’s lab was incredibly productive in large part due to its combination of skilled researchers, including the histologist and anatomist Hans Seyle. According to Li, several factors contributed to the eventual breakdown of Collip’s lab and its productivity by the end of the decade: Selye’s departure in 1938; Collip’s involvement in wartime administrative work relating to medical research; and new methods, techniques and instruments in protein chemistry that differed greatly from “Collip’s intuitive, ‘bathtub’ style of chemistry” (p. 112).

The role of the state in funding medical research in Canada after 1938 is the focus of chapter 7, a chapter that stands on its own for anyone

wanting a succinct account. (Cf. Alison Li, "Expansion and Consolidation: The Associate Committee and the Division of Medical Research of the NRC, 1938-1959," in *Building Canadian*, edited by Richard A. Jarrell and Yves Gingras, special edition of *Scientia Canadensis*, 15, 1991.) Before 1938, medical research was funded predominantly by universities, philanthropists and pharmaceutical companies. Collip's research funds derived from a combination of public and private sources, including foundation grants, private donations, and royalties from insulin, Emmemin and Premarin. For most of his career, he had been well funded but he had not forgotten his early financial struggles at the University of Alberta. Not surprisingly, Collip supported increased public funding alongside private funding of research. Collip became a member of the Associate Committee on Medical Research soon after its formation in 1938, and later became chair upon Banting's untimely death in 1941, working to increase public funding and coordination of medical research in Canada. With Collip playing a contributing role, the outcome was an extramural system of funding which supported investigations carried out in existing university facilities. Comparatively, Britain and the United States supported mixed extramural and intramural systems. These governments provided funds for research at medical schools and universities as well as creating central laboratories at the National Institute for Medical Research at Mill Hill and the National Institutes of Health in Bethesda, Maryland respectively. Li argues that Canada's National Research Council did not have much choice but to support an extramural program in Canada because of financial constraints and the availability of personnel. There was not a critical mass of researchers and they were widely dispersed, as described by Banting in his 1939 survey of Canadian research centres. Nevertheless Canada's extramural system of medical research support worked, as stated by Li, assisting in the "growth of medical research" and shaping "its institutions in the postwar period" (p. 165).

In chapters 6 and 7 which focus on medical research funding, perhaps Li might have expanded on several points. What was the role of philanthropic funding in medical research in Canada comparative to the United States and Great Britain? As Li mentions, the Bronfmans agreed to fund additional laboratories at McGill (p. 139-140); but with private philanthropists may come confrontation, such as the case of Thomas Bassett Macaulay (p. 72-76). What role did agencies, foundations and/or individuals play in shaping the type of medical research conducted? Is this not evident with disease-specific funding programs targeting tuberculosis, cancer, arthritis and rheumatism which may also reflect basic research verses clinical study funding debates? (p. 161-162)

Lastly, and clearly indicating my own interest, I found the final chapter on Collip's appointment as Dean of Medicine (1947-1961) and Professor of Medical Research (1947-1965) at the University of Western Ontario thin. I wanted to know more about his impact on medical education and research. Surely Collip's eighteen-year tenure at this university warranted more than five pages. Still standing today is the building with the inscription "Collip Medical Research Laboratory" which was so named after the addition of a storey and wing to the existing structure to accommodate the arrival of Collip and his staff. Collip died in 1965, and two years later the Department of Medical Research was disbanded.

Quibbles aside, this biography of Collip is well written, exhaustively researched, and rich in context. Li offers insight into the strengths and weaknesses of this man who as a scientist, entrepreneur, and leader contributed to key developments in the field of endocrinology and the institutionalization of medical research in Canada. Li reminds us that many of Collip's funding issues remain for today's researchers. Perhaps the difference being that today's medical research controversies are much more public with greater suspicions surrounding pharmaceutical company funded research. Anyone interested in the historical changes of twentieth-century medical research should read this book.

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